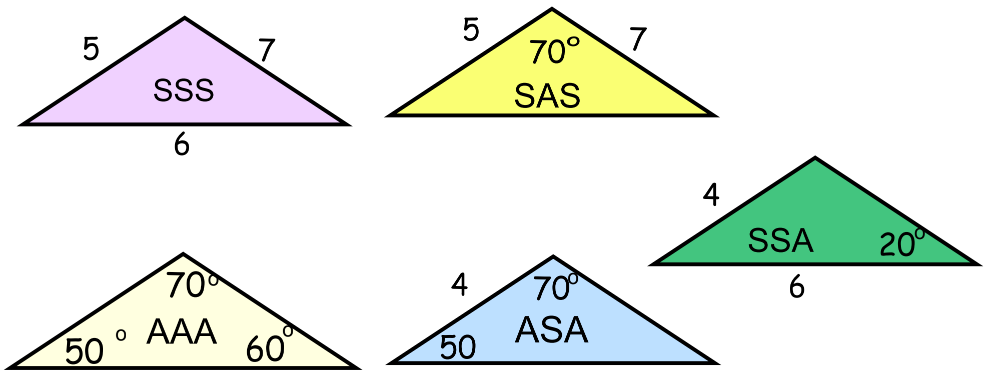
Precalc Warm Up # 11-2

Which triangles below are unique? In other words, if everyone in class were to construct a triangle with the given information, would everyone's triangle be identical?



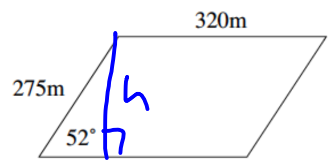
HW Questions, p. 288

1. Find the areas of these triangles that are labelled using standard notation.

	a cm	*b* cm	*c* cm	*A*	*B*	*C*
(a)	35.94	128.46	149.70	12°	48°	120°
(d)	33.91	159.53	163.10	12°	78°	90°
(e)	42.98	25.07	48.61	62°	31°	87°

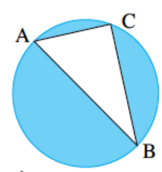
2. A car park is in the shape of a parallelogram. The lengths of the sides of the car park are given in metres.

What is the area of the car park?

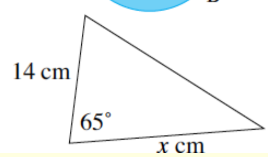


3. The diagram shows a circle of radius 10 cm. AB is a diameter of the circle. AC = 6 cm.

Find the area of the shaded region, giving an exact answer.



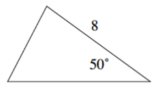
4. The triangle shown has an area of 110 cm^2. Find x.



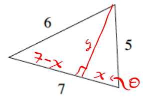
x cm

5. Find the area of the following

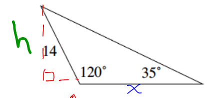
(a)



(b)



(c)



b)

$(7-x)^2+y^2=36 \qquad x^2+y^2=25$

$y^2=36-(7-x)^2 \qquad y^2=25-x^2$

$36-(7-x)^2=25-x^2$

$36-(49-14x+x^2)=25-x^2$

etc

find x. Then find θ

Then $A=\frac{1}{2}(7)(5)\sin\theta$

or use:

$A=\sqrt{s(s-a)(s-b)(s-c)}$

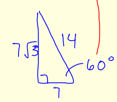
where $s=\frac{1}{2}(a+b+c)$

$\frac{(5+6+7)}{2}=9$

$A=\sqrt{9(9-5)(9-6)(9-7)}$

$\sqrt{9(4)(3)(2)}$

$A=\sqrt{216}$



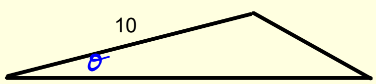
$\tan 35^\circ=\frac{7\sqrt{3}}{x+7}$

$x=\frac{7\sqrt{3}}{\tan 35^\circ}-7$

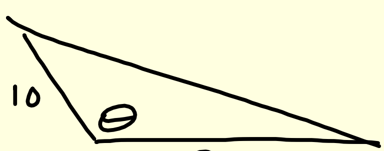
$A=\frac{1}{2}\left(\frac{7\sqrt{3}}{\tan 35^\circ}-7\right)(7\sqrt{3})$

b h

7. A triangle of area 50 cm^2 has side lengths 10 cm and 22 cm. What is the magnitude of the included angle?



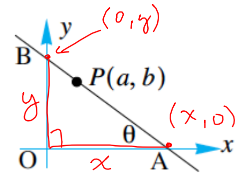
or



$\theta \approx$

2 different angles possible!

8. A variable triangle OAB is formed by a straight line passing through the point $P(a, b)$ on the Cartesian plane and cutting the x–axis and y–axis at A and B respectively.
If $\angle OAB = \theta$, find the area of ΔOAB in terms of a, b and θ.



* Now find relationships for x & y in terms of

$A = \frac{1}{2}xy$

$\tan\theta = \frac{y}{x}$ slope → $\frac{y-b}{0-a} = \frac{0-b}{x-a}$

Now solve that system for x & y to use in $A = \frac{1}{2}xy$.

OR see next pg. for a different approach:

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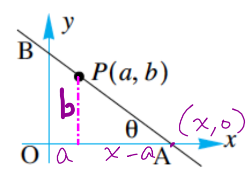


$\tan\theta = \frac{b}{x-a}$

$x - a = \frac{b}{\tan\theta}$

$x = \frac{b}{\tan\theta} + a$

$x = \frac{b + a\tan\theta}{\tan\theta}$

$A = \frac{1}{2}xy$

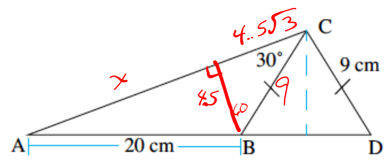
$A = \frac{1}{2}\left(\frac{b + a\tan\theta}{\tan\theta}\right)y$

AND: $\tan\theta = \frac{y}{x}$

so $y = x\tan\theta$

$y = \left(\frac{b + a\tan\theta}{\cancel{\tan\theta}}\right)\cancel{\tan\theta}$

9. Find the area of ΔABC for the given diagram.

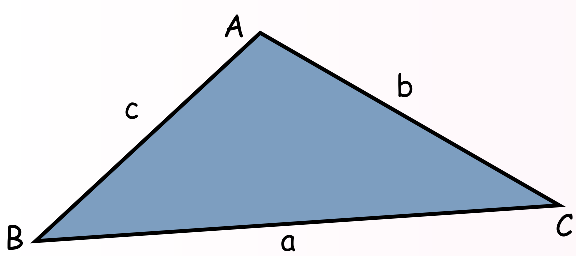


$4.5^2 + x^2 = 20^2$

after finding x,

Area ΔABC $= \frac{1}{2}(x + 4.5\sqrt{3})(9)\sin 30$

Last class, we learned how to find the area of triangles that were not necessarily right triangles.



AREA $= \frac{1}{2}ab\sin C$

$= \frac{1}{2}bc\sin A$

$= \frac{1}{2}ac\sin B$

Since the area is the same no matter which side you use for the base,

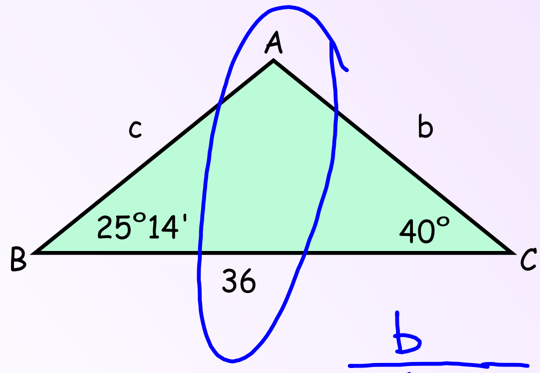
$$\frac{ab\sin C}{2} = \frac{ac\sin B}{2} = \frac{bc\sin A}{2}$$

$$\frac{\cancel{a}\cancel{b}\sin C}{\cancel{a}\cancel{b}c} = \frac{\cancel{a}\cancel{c}\sin B}{\cancel{a}b\cancel{c}} = \frac{\cancel{b}\cancel{c}\sin A}{a\cancel{b}\cancel{c}}$$

LAW OF SINES: $\boxed{\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}}$

Using Law of Sines to solve many of the triangles that were difficult to solve before.

Solving the ASA case:



$m\angle A = 114° 46'$

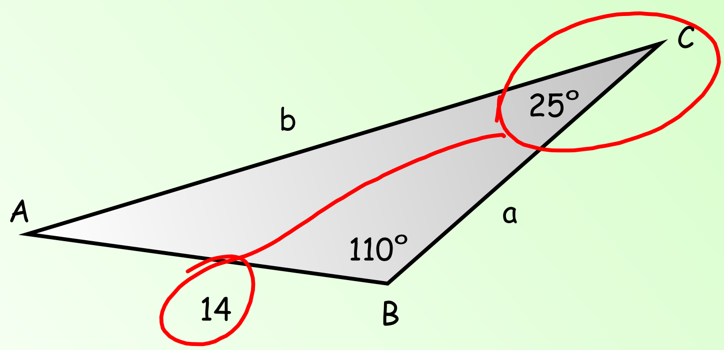
$b \approx$

$c \approx$

$$\frac{b}{\sin(25°14')} = \frac{36}{\sin(114°46')}$$

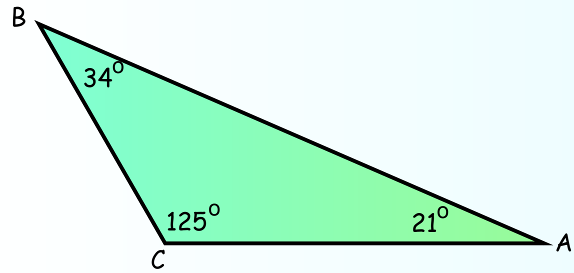
$b \approx 16.9$

Solving the AAS case:

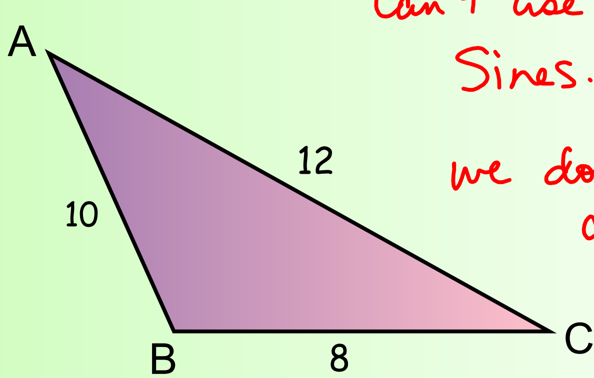


$$\frac{b}{\sin(110°)} = \frac{14}{\sin(25°)}$$

Solve the triangle (AAA case)



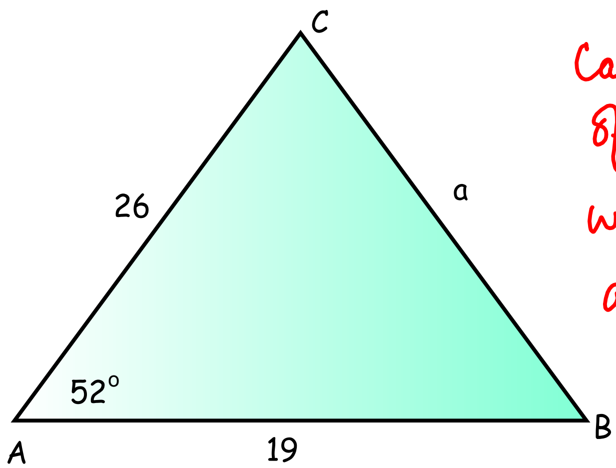
Solve the triangle (SSS case)



Can't use law of Sines.

we don't have any angles!

Solve the triangle (SAS case)



Can't use Laws of Sines because we don't have a known angle across from a known side!

The Law Of Sines has so far solved ASA and AAS,

but not the AAA, SSS, or SAS cases.

Nothing solves AAA cases because they are not unique.

SSS and SAS can be solved, but we will need a different tool for that. Law of Cosines

There is one case we still need to look at:
the ambiguous case: SSA.

The Law of Sines will solve that. . . tomorrow.

SL Book all week!

HW: p. 298 #1-9 odd, skip 7

p. 292 #1-11 odd

Set up problem #1 (p. 298) then check in with your group to make sure everyone agrees on the picture!